



NSSTC

NUCLEAR SECURITY
SCIENCE AND TECHNOLOGY CONSORTIUM

SCIENCE AND TECHNOLOGY CONSORTIUM



The Nuclear Security Science and Technology Consortium (NSSTC) provides Science, Technology, Engineering, and Math (STEM), including Computer Science, students from minority-serving institution (MSI) partners with an opportunity to learn and receive advice from practicing science and technology professionals at Nevada National Security Site (NNSS) about forward-leaning, cutting-edge technologies related to radiation detection systems and materials informatics with the desired end state.

Authors' Names: Sanjoy Mukhopadhyay & Paul Guss
Title: Nevada National Security Site support
for Minority Serving Institutions
Institution: Nevada National Security Site -
Remote Sensing Laboratory
Discipline: Minority Serving Institutions
Email: mukhops@nv.doe.gov (corresponding
presenter); gusspp@nv.doe.gov

A large number of selected topics are from proposals previously considered for the NNSS Site-Directed Research and Development program, namely

- fabrication of microfluidic chips and testing with nonradioactive surrogates,
- computational study of elpasolite scintillation detectors in active assay of special nuclear material (SNM),
- fast neutron gallium nitride scintillation experiments at the Los Alamos Neutron Science Center (LANSCE),
- compact muon scintillation detectors about the size of a cell phone,
- radiation sensors (CZT and CLYC sensors) integrated into unmanned aircraft system (UAS) platforms, and
- pursuing growth characterization of novel direct neutron conversion room temperature semiconductors.



Modern Direct Conversion Neutron Detection Materials

LiInSe_2 and $\text{LiInP}_2\text{Se}_6$ are being actively pursued for direct neutron detection at room temperature because of their favorable properties and large thermal neutron cross section of ^6Li . Both materials may be classified as medium-gap (around 2 eV) semiconductors having band structures and defect properties that allow moderate $\mu\tau$ and large bulk resistivity.

